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Past Present Future of AR and VR

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ABSTRACT: Augmented Reality (AR) and Virtual Reality (VR) are a part of these advanced and innovative forms of technologies that were thought of as a part of fiction even a few years ago. But now they are a vital part of the daily reality. The biggest confusion in the world is the difference between Augmented Reality and Virtual Reality. Augmented Reality is a synthetic, computer simulated reality or recreation of a real-time environment where a user can interact with the replicated real environments, whereas Virtual Reality is completely immersive. audio, visual and tactile simulations immerse users as if they were in the real world rather than simulated environments. Virtual reality (VR) and augmented reality (AR) optical head-mounted displays (OHMDs) are on the verge of becoming user-available mainstream equipment and are easy to use as tools for 3D activities. Some OHMDs include a front-facing camera that provides augmented reality (AR) and virtual reality (VR) capabilities. In addition to avoiding collisions with the environment, interactions with virtual objects can be influenced by the perspective of the real environment.

KEYWORDS: Augmented Reality (AR); Virtual Reality (VR);OHMD's (Optical Head Mounted Displays). ; maximum number of hops; network lifetime

I. INTRODUCTION

Augmented reality

Augmented Reality technology provides users with virtual objects in their natural environment. A user wearing VR goggles or looking at a smartphone/tablet screen sees information about the object they are looking at. The augmented and virtual reality systems use Optical Head Mount Displays (OHMD).OHMD consists of various sensors such as an inertial measurement unit (IMU) consisting of an accelerometer, gyroscope and magnetometer. It also has an audio capture system consisting of various microphones and cameras to display virtual objects, environments and more. OHMD creates a strong sense of presence in a user's body awareness and mediated environment in a computing environment.

Virtual Reality VR technology creates a virtual environment. Users wear helmets or Googles and interact in virtual environments, simulations or virtual reality.In some cases, users may wear special gloves or suits with sensors.

Virtual reality

VR technology creates a virtual environmentThe user wears a helmet or googles and interacts in the pretend environment, simulation, or virtual reality. In some cases, the user may wear special gloves with sensors, or even a suit.Virtual reality is a computer-generated simulation of an environment or three-dimensional image where people can interact in a physical or seemingly real way.With virtual reality, you feel like you are somewhere else. But that other place is a pretend place – a simulation or virtual world. Most people refer to this other place as the 'environment.'
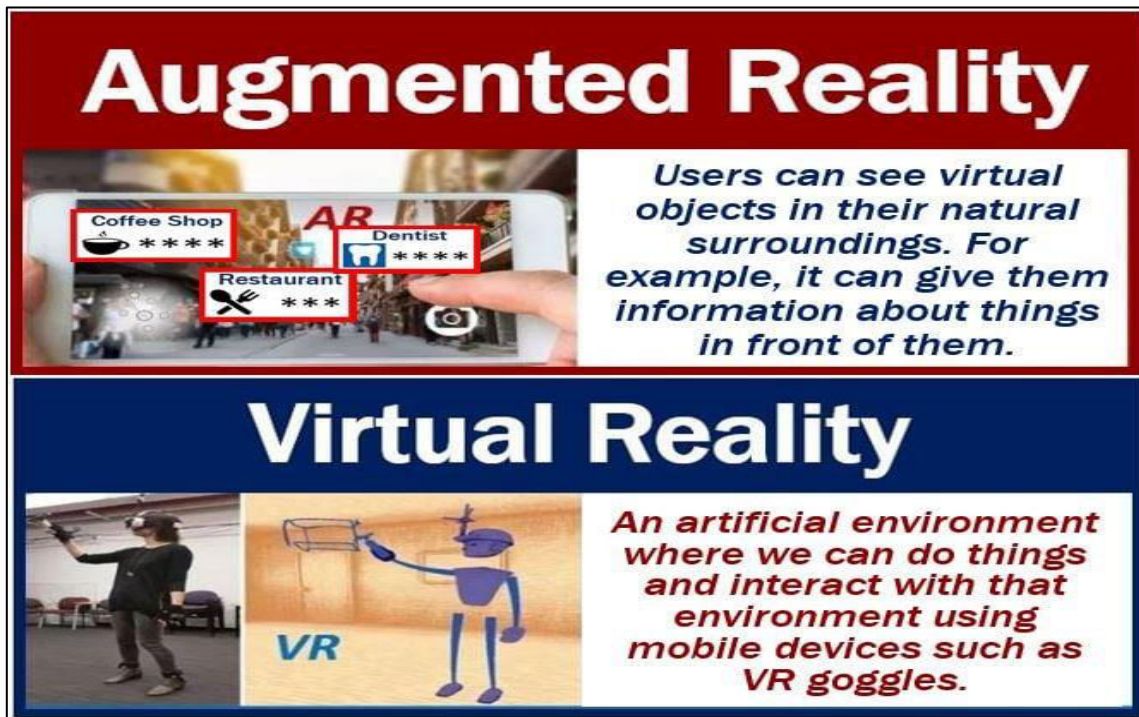
Fig.1.1 AR vs VR

II. RELATED WORK

Virtual reality is a computer simulation of an environment or 3D image that people can interact with in a way that appears physical or real. Virtual reality makes you feel like you are somewhere else. But this is another place. It is a pretend place, simulation or virtual world. Most people refer to these different places as "the environment." II. In related research the authors used the average remaining battery power of the entire network and calculated it by adding two fields to the RREQ packet header of the on-demand routing algorithm i). The remaining battery level of the nodes along the route. ii) The number of hops that the RREQ packet traversed. According to the equation, relay time is proportional to battery level. Nodes with battery energies greater than the average energy are selected because they have shorter retransmission times. Fewer hops are chosen at which step most nodes have the same retransmission time.The individual battery power of a node is considered as a metric of network lifetime extension in The author used an optimization function considering packet characteristics, packet size and distance between nodes, number of hops, and transmission time. In the initial population of the genetic algorithm was computed from multicast groups with a set of paths from source to destination and the expected lifetime of each path. Path lifetime is used as a fitness function. The fitness function selects the highest chromosome with the longest lifespan.Intersection and mutation operators are used to improve selection. In the authors improved the AODV protocol by introducing the idea of balanced power consumption into the path discovery process. RREQ messages are redirected when a node has enough power to transmit the message, otherwise the message is discarded. This condition is checked with a dynamically changing threshold. This allows nodes with dead batteries to refuse to route traffic, extending the life of the network.Inthe authors modified the AODV routing table by adding a power factor field. Only active nodes can participate in path selection, other nodes can be idle. The node lifetime is calculated and sent along with the Hello packet. In the authors considered the node's individual battery power and the number of hops, since a higher number of hops helps to reduce the power transmission distance. Route discovery is performed in the same way as the on-demand routing algorithm.After packets are delivered to the destination, the destination waits for time δt and collects all packets. After time δt, call the optimizer function to choose a path and send RREP. Optimizations use battery power from individual nodes. If a node has alow energy level, the optimizer will not use that node.

III. APPLICATIONS OF AUGMENTED REALITY

GAMING

AR allows for better gaming experiences as gaming grounds are being moved from virtual spheres to includereal-life experiences where players can perform real-life activities to play.

1. Retail and Advertisement

AR can improve customer experiences by presenting customers with 3D models of products and helping them make better choices by giving them virtual walkthroughs of products such as in a real estate.

2. Manufacturing AndMaintenance

In maintenance, repair technicians can be directed remotely by professionals to do repairs and maintenance works while on the ground using AR apps without having the professionals travel on the location. This can beuseful in places where it is hard to travel to the location.

3. Education

AR interactive models are used for training and learning.

4. Military

AR assists in advanced navigation and to help mark objects in real-time.

5. Tourism

AR, in addition to placing ads on AR content, can be used for navigation, providing data on destinations, directions, and sightseeing.

6. Medicine/Healthcare

AR can help train healthcare workers remotely, help in monitoring health situations, and for diagnosing patients.

IV. APPLICATIONS OF VIRTUAL REALITY (VR)

1. VR in Military

Both the military from the UK as well as the US have employed virtual reality in their training as it enables them to take up a wide range of imitations. Virtual Reality is utilized for all departments of service ranging from the navy, the army,the air force, marines to the coast guard.

2. VR in Education

VR is also deployed in the education sector for teaching and learning scenarios. It aids the students in conversing together, in the vicinity of a 3D environment. The students can also be carried on virtual field trips such as to museums, embarkingon tours of the solar system as well as traveling back in time to varying eras.

3. VR in Sports

Virtual Reality has been steadily shifting the sports industry for all its participants. This technology can be employed by coaches as well as players for training effectively across various sports, with them being able to view as well as experience particular scenarios repeatedly and enhancing their performance every time.

4. VR in Mental Health

VR technology, as I'd mentioned before, is being adopted to treat PTSD. By employing VRTD (Virtual Reality Exposure Therapy), a person is placed in a recreation of a traumatic event with the aim to help the person to come to terms with theevent and start recovering.

5. VR in Medical Training

VR is also being employed for practicing surgeries and procedures by medical as well as dental students, owing to its interactive characteristics, enabling a safe and guarded environment, free from any dire consequences, minimizing the risk of any harm or blunders upon practicing it on the actual patients.

6. VR in Architecture

VR applications have been offering an advantage to architects for presenting their ideas and designs for their clients with a 1:1 scale which will allow the clients to undertake an in-depth exploration of the project prior to accepting the designs and starting the construction operations.

V. AUGMENTED REALITY VS VIRTULAL REALITY:

Both Augmented Reality and Virtual Reality have the same goal of immersing the user into a virtual world. With AR, users continue to be in contact with the real world while interacting with the virtual objects around them, whereas with VR the user is far away from the real world while completely immersed into the virtual world
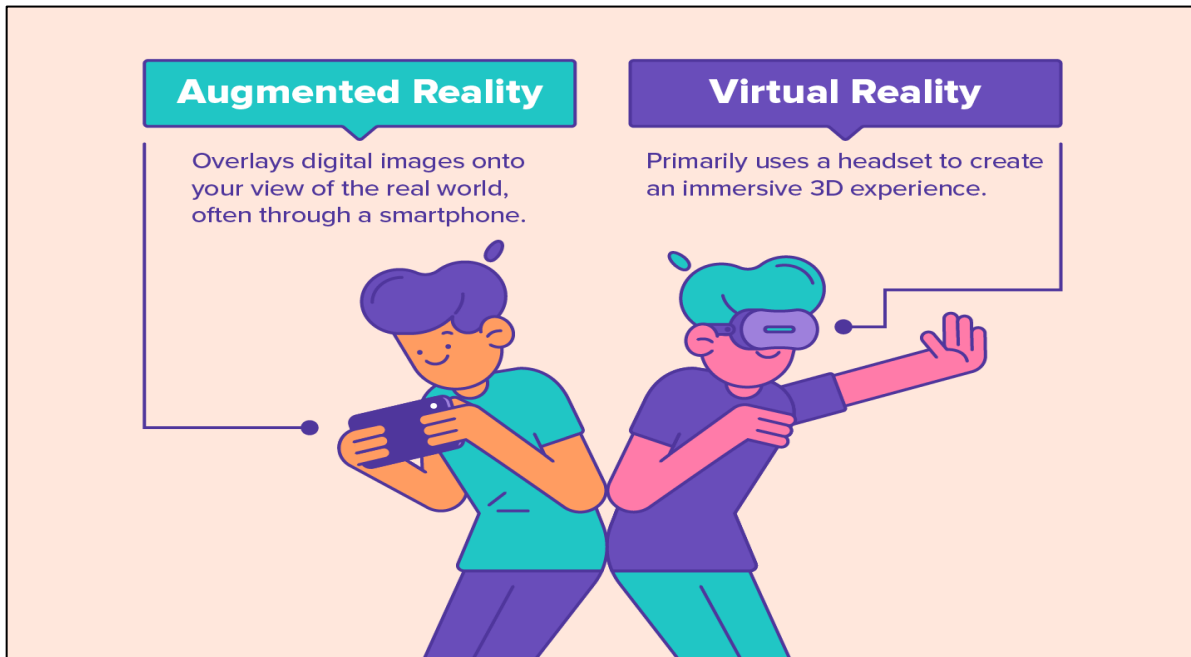

Fig.1.2 AR vs VR

VI. CONCLUSION AND FUTURE WORK

Augmented reality and virtual reality provide experiences that are evolving faster than expected and reaching heights in fieldsas diverse as entertainment, science, medicine, visualization and annotation, robot path planning, and military aviation.

There are already several products on the market. Virtual realityhas limitations. It provides full immersion, but blocks theuser from interacting with the environment.

VR OHMD is also associated with VR-induced nausea and vomiting, which can be a problem for some people. AR headsetsdo not require users to stand in one place. They can stay productive while on the go doingother tasks. This is also an important reason why AR is expected to have a greater impact on the enterprisemarket, even though itis currently lagging behind VR on the development curve.

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